**AP STATISTICS: Review for Ch. 19 – 22 QUEST**

1. We want to compare the proportion of men who are colorblind to the proportion of women. We take 2 independent random samples and find that there are 315 out of 1150 males that are colorblind and only 235 out of 1000 women.
   1. Find the standard error needed for a **confidence interval** comparing the males to the females.
   2. Find the pooled sample proportion (pooled ).
   3. Find the standard error needed for a **test of significance** comparing the males to the females.
   4. There are some doctors who believe that colorblindness occurs more frequently in males. Test this hypothesis at the 5% significance level.
   5. Interpret the P-value in this context.
   6. What would a Type I error be in this context? What is its probability?
   7. What would a Type II error be in this context?
   8. What would power be in this context?
   9. If we know that the power is 85%, what would the probability of a Type II error be?
   10. Since we rejected our Ho in part (c), create a 95% confidence interval for the difference between the % of males and females who are colorblind.
2. I perform a test of significance and I calculate a P-value of 0.06. Is this significant at the 5% level? How about the1% level? How about the 10% level?
3. What is the Z\* for a 91% confidence interval?
4. I have a 92% confidence interval that is (0.22, 0.26). Which of the following could be the 94% confidence interval?
   1. (0.20, 0.24) b. (0.20, 0.28) c. (0.23, 0.25) d. (0.23, 0.27)
5. Using the same info in #4, what could be the 90% confidence interval?
6. I have an interval that is (0.30, 0.39)
   1. What is my sample proportion ()? What is my margin of error?
   2. If my sample size is 200, what is my level of confidence?
7. I want to sample HS seniors to see what percent of them plan to attend the senior prom. I want to have a 6% margin of error, and want to be 99% confident. What sample size should I take? Last year’s result was 86%.
8. Nationwide, it is estimated that 40% of gas stations have tanks that leak to some extent. A new program in California is designed to lessen the prevalence of these leaks. We want to assess the effectiveness of this program and take a random sample of 45 stations and find that 15 of them have leaks.
   1. Create a 94% confidence interval for the percent of stations that leak.
   2. **Using this interval**, do you think that the percent of stations with leaks has decreased? Why or why not?
   3. Explain what 94% confidence means in this **context**.
9. Many doctors believe that teenagers do not get enough Vitamin C. Previous studies have indicated that up to 42% of teenagers are Vitamin C deficient. PA decides to implement a program to educate students about getting Vitamin C, in hopes of decreasing the % of teenagers who are deficient. After year, researchers take a random sample of 200 total HS students. They find that only 76 of them are Vitamin C deficient.
   1. Is there sufficient evidence at the 5% significance level that the campaign worked (and the % decreased)?
   2. Interpret the P-Value in this context.
   3. What would a Type I error be in this context? What is its probability?
   4. What would a Type II error be in this context? What would power be in this context?
   5. If we decreased our significance level to 3%, what would happen to the power, Type I error, and Type II error?